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IS 14325 (1996): Bypass protein feed for cattle [FAD 5: Livestock Feeds, Equipment and Systems]

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पशुओं के लिए बाईपास प्रोटीन चारा – विशिष्टि

Indian Standard

BYPASS PROTEIN FEED FOR CATTLE — SPECIFICATION

ICS 65.120

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

March 1996

Price Group 2

Livestock Feeds Sectional Committee, FAD 5

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Livestock Feeds Sectional Committee had been approved by the Food and Agriculture Division Council.

Dietary proteins in the ruminant diet are degraded in the rumen to peptides, amino acids and ammonia in varying amounts depending upon their solubility. The amount of amino acids available for absorption in the small intestine is the sum total of amino acids available from the microbial proteins and those derived from feed proteins which remain undegraded in the rumen but are subjected to enzymatic digestion in the intestines.

A significant portion of feed proteins which escapes ruminal microbial degradation in the rumen are termed as bypass proteins or undegradable proteins (UDP). Keeping in view the higher efficiency of utilization of rumen undegradable proteins (UDP), it is desirable to formulate feeds containing optimum level of rumen undegradable proteins.

For the determination of rumen undegradable protein (UDP) and rumen degradable protein (RDP) content, the phosphate solubility test method (*see* Annex C) has been specified in view of the reproducible results obtained by this method and its appropriateness for routine analysis. In case a better method for estimation of protein degradability is identified , that is, rapid, repeatable and reproducible and for which testing facilities are readily available, the same may be considered by the Livestock Feeds Sectional Committee for inclusion in this standard.

This Indian Standard has been formulated to guide the manufacturers and users about the quality of bypass protein feed. A few typical bypass protein formulae, which are being used by the cattle feed plants, are given in Annex D for guidance.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard
BYPASS PROTEIN FEED FOR CATTLE — SPECIFICATION

1 SCOPE

1.1 This standard prescribes the requirements, methods of tests and sampling for bypass protein feed for cattle.

2 REFERENCES

2.1 The Indian Standards listed in Annex A contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated.

3 REQUIREMENTS

3.1 Description

Bypass protein feed shall be in the form of meal or pellets.

3.2 Ingredients

The ingredients for manufacture of bypass protein feed shall be selected from those listed in Annex B.

3.3 The feed shall be free from harmful constituents, metallic pieces and adulterants. The feed shall also be free from fungal growth, insect infestation and from fermented, musty or any other objectionable odour.

3.4 The material shall also conform to the requirements specified in Table 1.

Table 1 Requirements for Bypass Protein Feed

Sl No. (1)	Characteristic (2)	Requirement (3)	Methods of Test, Ref to (4)
i)	Moisture, percent by mass, *Max*	11	4 of IS 7874 (Part 1) : 1975
ii)	Crude protein (N × 6.25) percent by mass, *Min*	30	5 of IS 7874 (Part 1) : 1975
iii)	Crude fat, percent by mass, *Min*	3.5	7 of IS 7874 (Part 1) : 1975
iv)	Crude fibre, percent by mass, *Max*	8	8 of IS 7874 (Part 1) : 1975
v)	Acid insoluble ash, percent by mass, *Max*	2.5	10 of IS 7874 (Part 1) : 1975
vi)	Rumen undegradable protein (UDP), percent by mass, *Min*	20	Annex C of this standard
vii)	Rumen degradable protein (RDP), percent by mass, *Min*	9	do
viii)	Common salt (as NaCl), percent by mass, *Max*	2	4 of IS 7874 (Part 2) : 1975
ix)	Calcium (as Ca), percent by mass, *Min*	1.2	IS 13433 (Part 1) : 1992
x)	Phosphorus (as P), percent by mass, *Min*	1	6 of IS 7874 (Part 2) : 1975
xi)	Vitamin A, IU/kg, *Min*	10 000	(*See* Note 2)

NOTES

1 The values specified for characteristics (ii) to (x) are on moisture free basis.

2 As there is no suitable and easily workable method for determination of Vitamin A available at present, the manufacturers would be required to maintain a record showing the quantity of Vitamin A added to each batch. As and when a suitable method is identified, which is repeatable and reproducible and for which testing facilities are readily available, the same may be prescribed in the standard by the Livestock Feeds Sectional Committee.

4 PACKING AND MARKING

4.1 Packing

Bypass protein feed shall be packed in clean, dry and sound jute bags with or without polyethylene lining. The mouth of each bag shall be machine stitched.

4.2 Marking

Each bag shall be legibly marked or labelled to give the following information:

a) Name of the material;
b) Name of the manufacturer;
c) Net mass in kg;
d) Batch or code number;
e) Crude protein content;
f) Crude fibre content;
g) Calcium content;
h) Phosphorus content;
j) Vitamin A content in IU/kg;
k) Rumen degradable protein content;
m) Rumen undegradable protein content;
n) Metabolizable energy (calculated) kJ/kg (1 kJ = 0.238 846 kcal);
p) Directions for use; and
q) Feeding recommendations for milk production, expressed in g/kg of milk. For example, bypass protein feed may be fed at the following rates for milk production:
    i) For Cow — 300 g/kg milk
    ii) For Buffalo — 350 g/kg milk

4.2.1 *BIS Standard Mark*

Each bag may also be marked with the Standard Mark.

4.2.1.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

5 SAMPLING

5.1 Representative samples of the material shall be drawn and conformity of the material to the requirements of this specification shall be determined according to the methods prescribed in Appendix C of IS 2052:1979.

ANNEX A

(*Clause* 2.1)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
920 : 1972	Specification for common salt for animal consumption including cattlelicks mineralized (*first revision*)
1070 : 1992	Specification for reagent grade water (*third revision*)
1162 : 1958	Specification for cane molasses
1664 : 1992	Specification for mineral mixtures for supplementing cattle feeds (*third revision*)
1712 : 1982	Specification for cottonseed oilcake as livestock feed ingredient (*second revision*)
1713 : 1986	Specification for decorticated groundnut oilcake as livestock feed ingredient
1932 : 1986	Specification for mustard and rapeseed oilcake as livestock feed ingredient (*second revision*)
1934 : 1982	Specification for sesamum oilcake as livestock feed ingredient (*first revision*)
1935 : 1982	Linseed oilcake as livestock feed ingredient (*first revision*)
2052 : 1979	Specification for compounded feeds for cattle (*third revision*)
2152 : 1972	Specification for maize gluten feed (*first revision*)
2154 : 1986	Coconut oilcake as livestock feed ingredient (*second revision*)
2239 : 1971	Specification for wheat bran (*first revision*)
3163 : 1965	Specification for rice polish

IS No.	*Title*
3440 : 1985	Solvent extracted linseed oilcake (meal) as livestock feed ingredient (*first revision*)
3441 : 1982	Specification for solvent extracted groundnut oilcake (meal) as livestock feed ingredient (*first revision*)
3591 : 1985	Specification for solvent extracted coconut oilcake (meal) as livestock feed ingredient (*second revision*)
3592 : 1985	Solvent extracted decorticated cottonseed oilcake (meal) as livestock feed ingredient (*second revision*)
3593 : 1979	Specification for solvent-extracted rice bran as livestock feed (*second revision*)
4193 : 1986	Specification for guar meal as livestock feed ingredient (*first revision*)
7874 (Part 1) : 1975	Methods of test for animal feeds and feeding stuffs:Part 1 General methods
7874 (Part 2) : 1975	Methods of test for animal feeds and feeding stuffs:Part 2 Minerals and trace elements
10657 : 1983	Solvent extracted soybean oilcake (meal) as livestock feed ingredient
13433 (Part 1) : 1992	Animal feeds and feeding stuffs — Determination of calcium : Part 1 Titrimetric method

ANNEX B

(*Clause* 3.2)

INGREDIENTS FOR BYPASS PROTEIN FEED

Grains

Barley (*Hordeum vulgare*)
Maize (*Zea mays*)
Milo (*Sorghu vulgare*)
Bajra (*Pennisetum typhoides*)

Grain By-Products

Rice polish (*see* IS 3163 : 1965)
Wheat bran (*see* IS 2239 : 1971)
Maize gluten (*see* IS 2152 : 1972)
Solvent extracted rice bran (*see* IS 3593:1979)

Oilcake and Meals

Coconut oilcake (*see* IS 2154 : 1986) and Solvent extracted coconut oilcake (meal) (*see* IS 3591 : 1985)
Cottonseed oilcake (*see* IS 1712 : 1982) and Solvent extracted decorticated cottonseed oilcake (meal) (*see* IS 3592 : 1985)
Groundnut oilcake (*see* IS 1713 : 1986) and Solvent extracted groundnut oilcake (meal) (*see* IS 3441 : 1982)
Linseed oilcake (*see* IS 1935 : 1982) and Solvent extracted linseed oilcake (meal) (*see* IS 3440 : 1985)
Mustard and rapeseed oilcake (*see* IS 1932 : 1986) and Solvent extracted mustard and rapeseed oilcake meal
Sesame oilcake (*see* IS 1934 : 1982) and Solvent extracted sesame oilcake (meal)
Soybean oilcake and solvent extracted soybean oilcake (meal) (*see* IS 10657 : 1983)
Guar meal (*see* IS 4193 : 1986)

Industrial By-Products and Others

Molasses (*see* IS 1162 : 1958)
Mineral mixture (*see* IS 1664 : 1992)
Salt (*see* IS 920 : 1972)

ANNEX C

[*Foreword, Table* 1, *Sl No.* (vi) *and* (vii); and *clause* 5.1]

DETERMINATION OF RUMEN DEGRADABLE PROTEIN (RDP) AND RUMEN UNDEGRADABLE PROTEIN (UDP)

C-1 APPARATUS

C-1.1 Water Bath-cum-Shaker

Apparatus with temperature control thermostat and mechanical shaking device.

C-2 REAGENTS

C-2.1 0.15 M Sodium Di-hydrogen Phosphate

Dissolve 23.401 5 g of pure sodium di-hydrogen phosphate in distilled water (*see* IS 1070 : 1992) and make the volume to one litre.

C-2.2 0.15 M Di-Sodium Hydrogen Phosphate

Dissolve 26.698 5 g of pure Di-sodium hydrogen phosphate in distilled water (*see* IS 1070 : 1992) and make the volume to one litre.

C-2.3 Buffer Solution

Mix together 195 ml of solution under **C-2.1** and 305 ml of solution under **C-2.2** and make up the volume to one litre with distilled water (*see* IS 1070 : 1992). The *p*H of the buffer solution is adjusted to 7. Fresh buffer solution should be prepared for each testing.

C-3 PROCEDURE

C-3.1 Preparation of Sample

Dry the test sample in the oven at 70°C for 2 to 3 hours and then grind it.

C-3.2 Incubation of the Sample with Buffer Solution

Weigh 1 g of the sample in 150 ml capacity conical flask. To this, add 50 ml of fresh buffer solution (**C-2.3**). Incubate the flask in the water bath maintained at 39 ± 0.5°C for two hours. Shake the flask mildly while incubating. After incubation, filter the material using Whatman filter paper No. 41.

C-3.3 Estimation

Crude protein (N × 6.25) content in the filtrate (**C-3.2**) as well as in the original sample (**C-3.1**) are determined using method of nitrogen estimation as given in IS 7874 (Part 1) : 1975.

C-3.4 Calculation

RDP and UDP contents in the sample are determined as follows:

Total protein in the sample = Y

Soluble protein in the buffer solution (RDP) = X

Insoluble protein in the buffer solution (UDP) = Y − X

ANNEX D

(*Foreword*)

TYPICAL BYPASS PROTEIN FEED FORMULAE

In the manufacture of bypass protein feed, a variety of feed formulae are being used, for which the following ingredients in the proportions indicated, need to be maintained:

Grain	8 Percent, *Min*
Rice Polish	5 Percent, *Min*
Wheat Bran	5 Percent, *Min*
Mineral Mixture (without salt)	2 Percent, *Min*

A few typical bypass protein feed formulae are given below:

Sl No.	*Ingredients*	*Examples of Bypass Protein Feed Formulae, Percentage*				
		I	II	III	IV	V
i)	Maize or Milo	8	8	8	8	8
ii)	Rice polish fine	7	13	5	5	13
iii)	Groundnut oilcake	18	—	18	18	—
iv)	Molasses	—	—	8	8	8
v)	Mineral mixture	2	2	2	2	2
vi)	Salt	2	2	2	2	2
vii)	Cottonseed meal	35	28	35	34	26
viii)	Rapeseed meal	—	10	—	—	—
ix)	Soya meal	—	15	—	2	—
x)	Guar meal	2	—	3	3	10
xi)	Maize gluten	15	15	15	14	15
xii)	Groundnut extracted	—	—	—	—	11
xiii)	Wheat bran	11	7	5	5	5

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